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"LIVING OFF THE COUNTRY" AS A METHOD OF ARCTIC EXPLORATION

By VILHJÁLMUR STEFÁNSSON

While the geographical work of the Canadian Arctic Expedition of 1913-1918, during its five years of discovery and exploration, has been considerable,[1] it will perhaps be thought more important that we have introduced a new method in polar exploration, a method which makes possible a great reduction of equipment and increases the safety as well as the possible length, both in mileage and in time, of journeys over the sea ice or along uninhabited lands.

It is, however, true of this method, as of most others, that it is new in one sense only. We built on the work of our predecessors. In the forties of last century, after the death through illness of Sir John Franklin and a few of his men, the remainder starved to death in the vicinity of King William Island. A few years later Dr. John Rae, of the Hudson's Bay Company, who understood Arctic conditions and is the pioneer in our sort of exploration, wintered in the same vicinity, at Repulse Bay, in safety and comfort on game killed with exactly the same sort of weapons the Franklin party had. The difference between safety and disaster lay in the methods of the two parties. The fact that Franklin's men numbered over a hundred should not have made it any more difficult for them to live on the resources of the country than it was for Rae's party of about twenty, since Eskimos in the same vicinity sometimes travel in even larger parties, although their arms and their equipment are distinctly inferior to those of Franklin's men.

In the further search for relics of the Franklin expedition, Schwatka and Gilder lived as guests of the Eskimos near King William Island, and later so did Charles Francis Hall. The early chapters of the account of Hall's third expedition show that had he lived he would probably have profited in the far northern waters of Greenland by the knowledge gained at King William Island.

In the nineties of the last century Nansen and Johansen made their remarkable journey north from the *Fram* and later south to the Franz Josef archipelago. After reaching these islands they lived on walrus meat, but while they were on the moving ice of the ocean they depended only on the food on their sledges and later killed some of their dogs and fed

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[1] The activities of the expedition may be followed in these pages, viz.: *Bull. Amer. Geogr. Soc.*, Vol. 45, 1913, pp. 288, 525-526; Vol. 46, 1914, pp. 51-52, 184-191, 520-523, 773-774; Vol. 47, 1915, pp. 766-769; R. M. Anderson: Recent Explorations on the Canadian Arctic Coast, *Geogr. Rev.*, Vol. 4, 1917, pp. 241-266, with 2 maps in 1:15,200,000 and 1:4,500,000; *Geogr. Rev.*, Vol. 5, 1918, pp. 238-241; Vilhjálmur Stefánsson: The Activities of the Canadian Arctic Expedition from October, 1916, to April, 1918, *Geogr. Rev.*, Vol. 6, 1918, pp. 354-369, with map in 1:9,500,000.

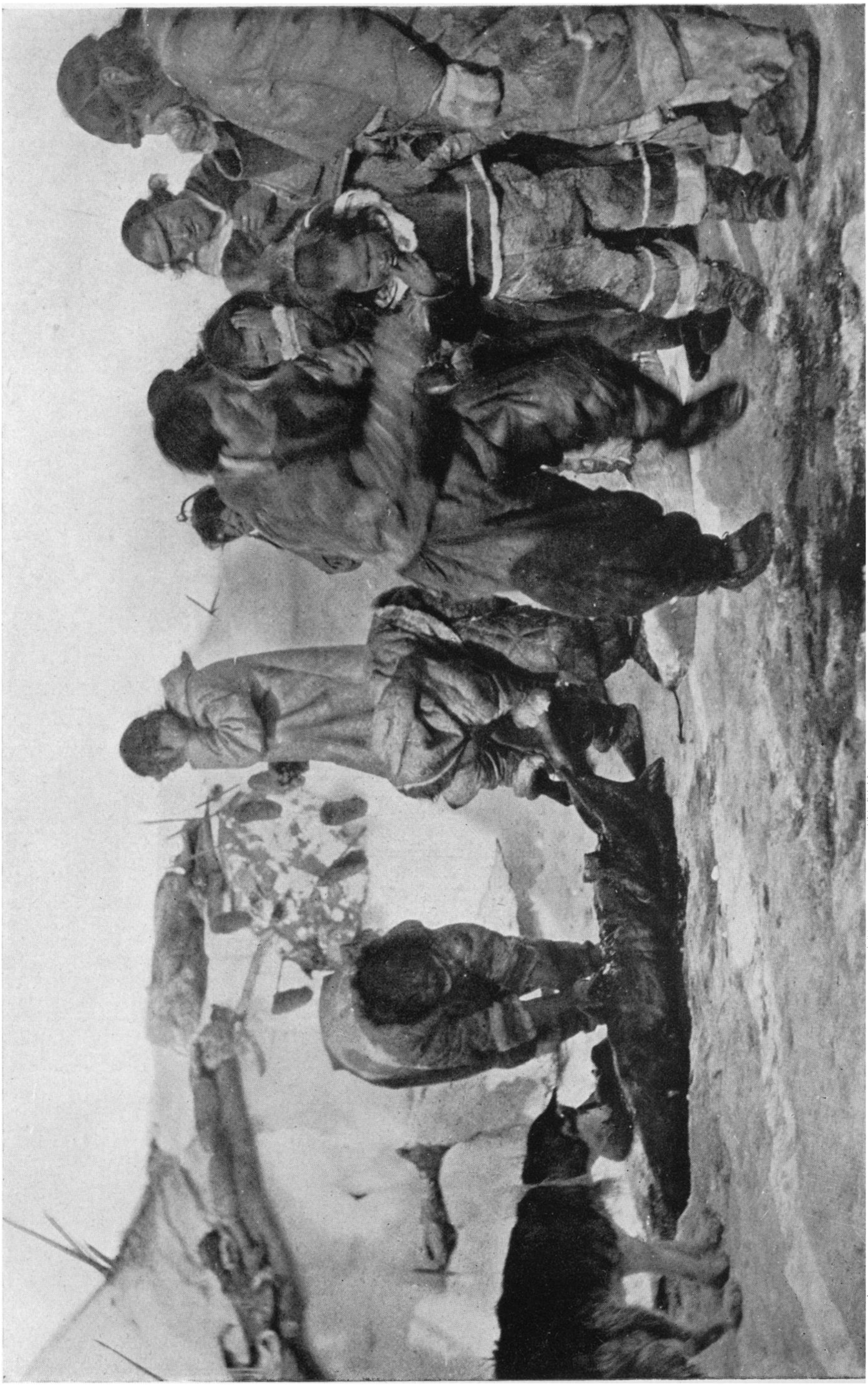


FIG. 1—Eskimos skinning a seal, Coronation Gulf.

them to the other dogs—clear proof that they either did not realize that game could be secured at sea or thought it actually absent. In his journeys northward over the ice from Greenland and from Grant Land, Admiral Peary used to secure game for his men and his dogs when he got back to shore after his dashes northward into the ice, but he placed no dependence on getting game while at sea. In his winter camps he also used to secure, through his Eskimo hunters, large quantities of fresh meat, which effectivel prevents the scurvy that has been so annoying in most polar expeditions and so disastrous even in some of the more recent ones. The commanders or medical officers in these instances, with an astonishing obliviousness to the lessons of experience, have vainly tried to prevent scurvy with vegetables, fruits, and lime juice brought from home.

In 1904 David Hanbury with two white and twenty Eskimo companions lived on game for about six months on a journey from Chesterfield Inlet north to the Arctic coast, thence west to the Coppermine River and south to Great Bear Lake and the Hudson's Bay Company posts on the Mackenzie. The Eskimos did practically all the hunting which supported this party.

Feasibility of a Diet of Fish and Meat

As guest of the Eskimos, I spent the winter of 1906-1907 in the Mackenzie delta. For fifteen years those Eskimos had been in the habit of purchasing yearly more or less of white men's provisions from the whalers at Herschel Island; but that year no whalers had entered the Arctic, and no such foods were obtainable in the delta. The family I stayed with had a little tea, purchased from the Hudson's Bay Company at Fort MacPherson; but, as they were very fond of it and I was not, I drank it not more than twice a week, while they drank it two or three times a day. This tea was the only article of white man's food. There was no salt nor other seasoning, no flour nor other item of groceries, and no fruits or vegetables in any form. It was here that I learned from experience what I already knew theoretically—that salt is not necessary for health, and that the desire for it disappears in about three months when one is without it. Our food was fish only—some fresh, some summer-dried, and some that had become rotten in storage during the summer months. After living on these three kinds I became fond of all of them and found that at the end of four months I was, so far as I could judge, in as good a physical and mental condition as I have ever been. I weighed ten pounds more than I had ever weighed before and about fifteen pounds more than my normal weight since, when I have been living in cities or elsewhere on civilized diet. I have known no white man who has lived on an exclusive meat diet for a year or more who has any marked desire to go back to a varied diet. Several of our men, while they were in the north and after returning south, have told me they found both that the elaborate diet of civilization does not agree with them so well as meat and that they do not enjoy their meals as much.

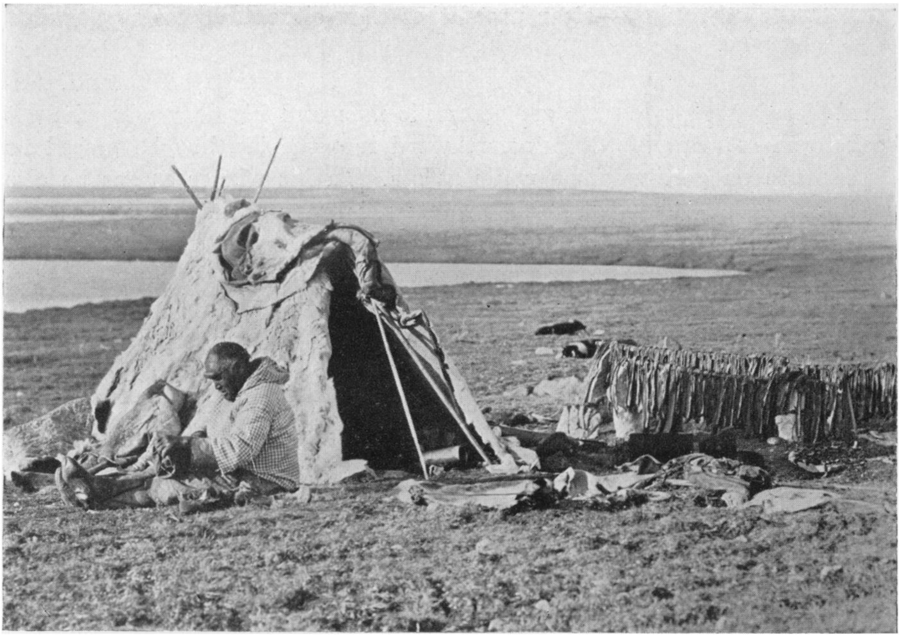


Fig. 2.

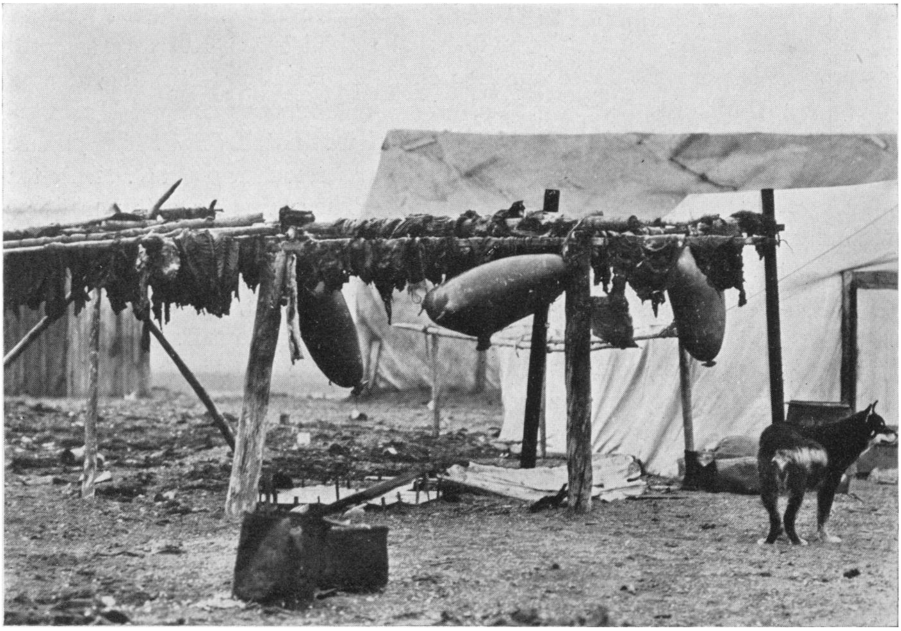


Fig. 3.

Fig. 2—A typical summer hunting camp of the uncivilized (bow-using) Eskimos on the tundra of northern Canada.

Fig. 3—Food caches, Baillie Island, July, 1916. Note the inflated seal skins.

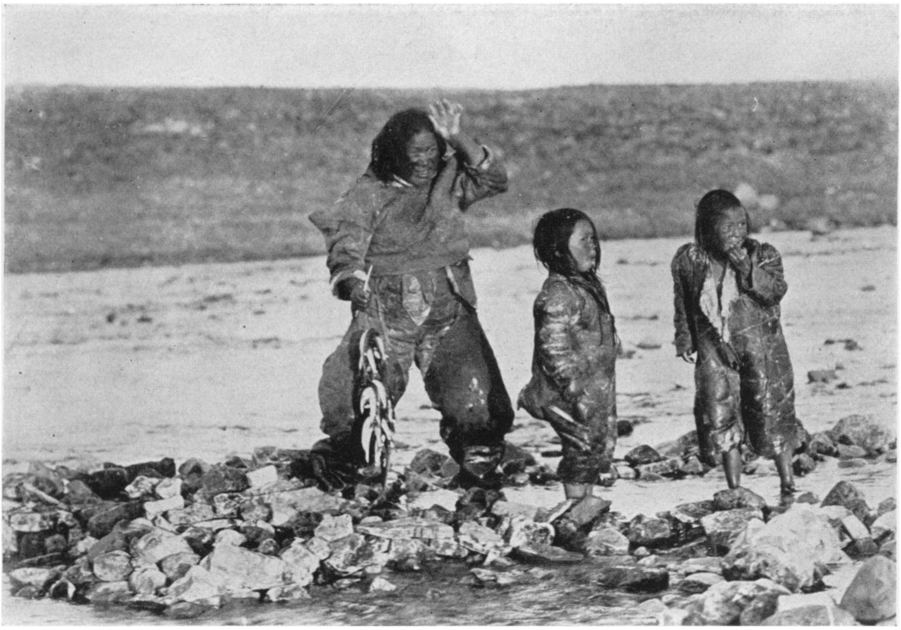


FIG. 4.

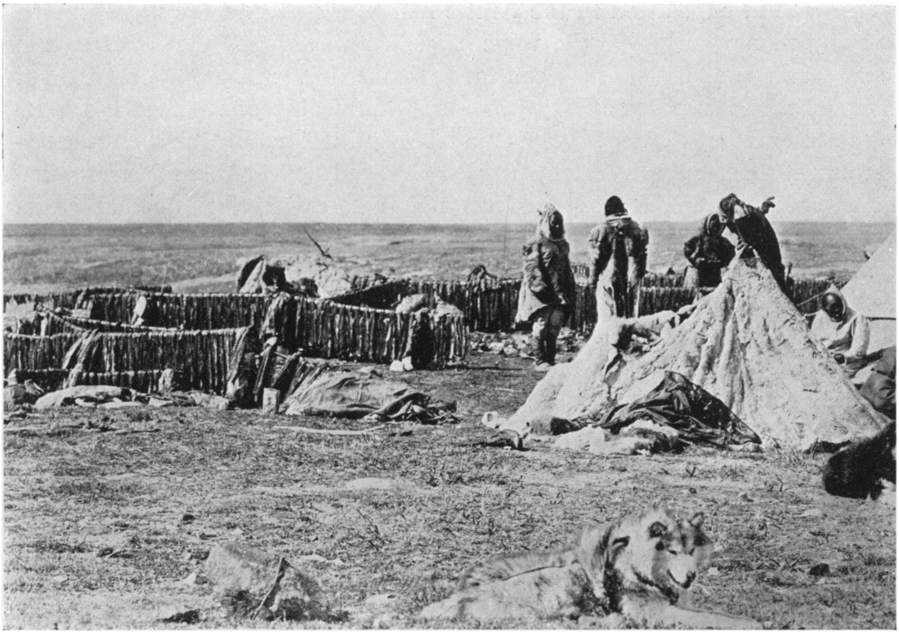


FIG. 5.

FIG. 4—Eskimo woman and girls at the fishing creek, Dolphin and Union Strait, June, 1916. (For a view of salmon spearing at the same place see Fig. 3, *Geogr. Rev.*, Vol. 4, 1917, p. 85.)

FIG. 5—Fish drying at a summer camp of the Eskimos.

It was clear to me from this demonstration that the food which the Arctic supplies is adequate for health and that one likes it when he gets used to it. The only question then was, Could meat or fish be secured in places that needed exploration? If that were possible, then a party suitably armed and otherwise equipped could go anywhere, stay anywhere, and make exploratory journeys of any length in the Arctic.

During the years 1908-1912, when at work under the auspices of the American Museum of Natural History and the Geological Survey of Canada on the north coast of Canada and Alaska and also in the interior on Horton River and near Great Bear Lake as well as in Victoria Island, my party frequently lived several months at a time and once more than a year at a time on the product of our rifles and fish nets. The fishing was always inconsiderable, and on our longest and most difficult journeys we never tried to get fish, except occasionally for the "fun of it" when encamped in what happened to be good fishing localities. When you have lived for two or three years on caribou meat, you wouldn't go a mile out of your way to get food of any other kind, unless it were for reasons of ostentation, as with the Eskimos, who want to have their neighbors know that they can afford to eat expensive imported foods.

Abundance of Animal Life in the Arctic

Our second expedition in the Arctic had thus proved to my satisfaction that any man who knows the ways of wild animals and the hunting and living methods of the Eskimo can load on one dog team all the equipment he needs for a journey of a year or even several years. That the same could be done at sea would appear an inevitable corollary of that conclusion of oceanography, so frequently emphasized by Sir John Murray and others, that the amount of floating animal life per cubic unit of ocean water is least at the equator and increases towards the poles. Although laymen commonly do not make this generalization and not infrequently assume the opposite, still the fact is really one of the best attested by universal experience. There are no well-known fisheries of importance in tropical waters. The coast cities of Florida and Georgia, for instance, are not fishing cities in the sense that Gloucester and Marblehead are, and even the Gloucester fishermen sail northerly from their homes, for the cod are on the Newfoundland Banks and the halibut around Iceland. In Europe the Spaniards have to import the fish they eat in Lent, and the harvest of the sea is rich about the British Isles and richer still up on the coast of Norway.

So far as we knew there was no reason why this law should break down when the fringe of the Arctic was reached, and I for one believed that the polar sea was richly supplied with animal life, if one only knew how to find it and get it. If polar explorers had traveled over the sea ice without reporting the seals I felt sure were there, this to me was no stranger than that tourists frequently sail from New York to Liverpool and cross the Newfoundland Banks without noticing anywhere the undisputed cod.

Over Sea Ice with a Single Dog Sledge

We found ourselves on the north coast of Alaska in the winter of 1913-1914, with two ships still safe, the *Alaska* and the *Mary Sachs.* The *Karluk* had got too far off shore and been caught in the ice and carried away. But though there still were two ships safe, they contained very little of the special equipment commonly used in Arctic exploration, for it had been the task of the *Alaska* from the beginning only to work on the mainland coast of America, and the *Mary Sachs* had been intended as a tender to wait on whoever needed her services and to do oceanographic work in the comparatively safe waters between Herschel Island and Banks Island. The *Karluk* carried most of our pemmican, malted milk, and other condensed food. The *Mary Sachs* and the *Alaska* had some light sledges, suitable for work on the comparatively level ice inshore, but the *Karluk* had carried all but two of the heavy sledges specially designed for rough ice work.

Through accidents and other circumstances we did not even have the full use of the equipment of the *Alaska* and the *Mary Sachs* and eventually had to do our work of the spring of 1914 with one sledge and six dogs. These were exceptionally good dogs, weighing from 90 to 130 pounds each, and they pulled a load at the start of 244 pounds a dog, which is about double the greatest amount hauled by dogs in previous polar exploration, so far as is known to me. I walked ahead to pick the road through the rough ice, and the other two men did not need to help the dogs except in especially bad places. Where the going was even reasonably good we made 15 to 25 miles per day, although in places where a road had to be made by pickaxes over the miniature mountain ranges of broken ice we call "pressure ridges" we made only a hundred or two hundred yards an hour.

No More Need for Dog to Eat Dog

Journeys over the sea ice before ours had been conducted on the theory that the Arctic is a barren and desolate waste where, because of absence of local resources, you must carry with you all the food you are going to eat and all the fuel you expect to burn. For that reason Nansen and those who followed him, for what they considered to be the stern necessity of polar exploration, not only carefully calculated every ounce of food but, as the sledges were emptied of provisions, killed the dogs one by one and fed them to the other dogs. Peary never planned to kill dogs to feed to other dogs, but he kept them, as well as his men, upon rigorous rations, for he expected no replenishment of his stock, and it was necessary to be mathematically exact in adjusting food and fuel to the proposed length of the journey. Under this system, he tells us in his book "The North Pole," he expected to lose sixty per cent of his dogs. Many would probably be killed in fighting among themselves, as the dogs were numerous and were never tied at night. Others probably would be lost through the thoughtless cruelty of his Eskimos, and a dog that becomes lean either through excessively hard work or because of limited rations is very likely to freeze to death on an especially cold night.

Adapting to the Environment, Our Policy

But we based our exploration on a fundamental assumption differing diametrically from that of our predecessors. Where they postulated a dearth of all food and fuel and an environment at every point hostile to man, we assumed an environment friendly if you adapt yourself to it, instead of fighting it, and we expected to find waiting for us wherever we went an abundance of food and fuel which merely required for its finding an "icecraft" corresponding to the woodcraft of Boone or the plainscraft of Carson. This we considered we had acquired in five years of proving all things that the Eskimos know and do and of holding fast that which was good. On this theory we needed to carry no food or fuel with us, but merely the equipment for securing them, and so we needed not ten- or twenty-dog sleds like previous expeditions but one sled only and six dogs. We could not afford to lose, however, even one of those six dogs. Furthermore, when a dog has worked faithfully for you for months or years you become so fond of him that to lose him is like losing a friend. For these

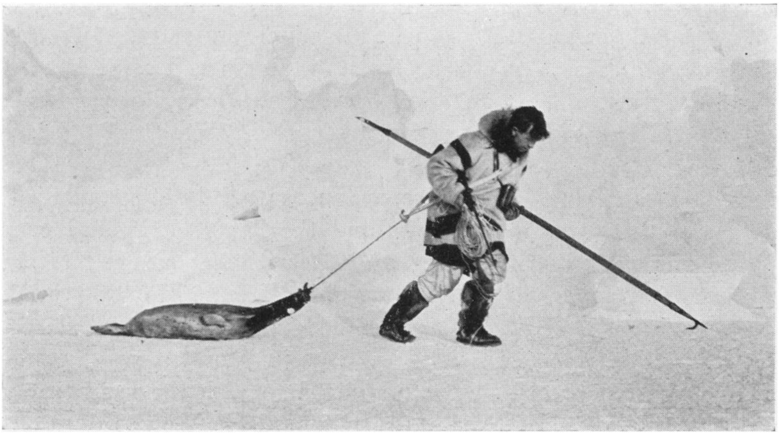


FIG. 6—The author hauling a seal "ashore" that has been shot in the open water. If near enough, the dead seal is secured by means of a line to which is attached a ball of wood with recurved hooks on three sides. The ball is thrown beyond the seal and pulled in gradually until one of the hooks catches in the carcass, which can then easily be brought up to the edge of the ice.

reasons we were very careful of our dogs, tied them every night to prevent fighting, and were nearly always able to feed them so well that in spite of hard work they were continually fat. In our five years there were two or three occasions when, through a combination of hard work, extremely cold weather, and temporary shortage of game, the dogs became lean through short rations, although they never actually had to go without a meal. But even when this happened it was only a few weeks till, through generous feeding, they had become fat again.

Abundance of Seals

At sea we found no diminution in seal life even as we went farther from land. The number of seals varies in different parts of the ocean, but this depends apparently neither on latitude nor on distance from shore but on the mobility of the ice. Wherever there are strong currents and the ice breaks easily, as north of Alaska, for instance in latitude 73° or 74° N., seals are abundant though it is far from shore. But in the region northwest of our new islands and northwest of Ellef Ringnes Island the ice is extraordinarily sluggish in movement and consequently very thick. Wherever there is much open water in the summer there will be many seals the following winter; but in this region there is very little open water in the summer, and a scarcity of seals is to be expected. Still, in the spring of 1916 we found enough seals for our needs and more seals the farther north we went, showing clearly that the high latitude was not to be blamed for the scarcity.

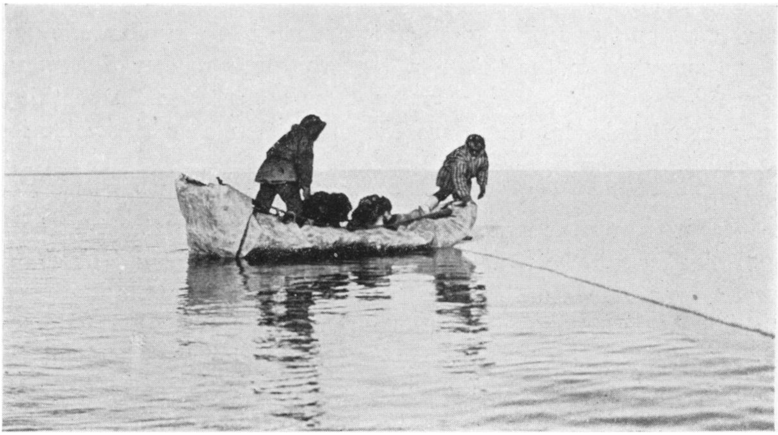


FIG. 7—Boat used in securing a seal that has been shot in the open water when the carcass is beyond the reach of the line described in Figure 6. This boat is made by lashing a 40-pound waterproof tarpaulin around a sled. The tarpaulin, when rolled up, takes up no more space than a bolt of cloth in a store; yet such a boat can carry a thousand pounds. This device has made it possible for the author easily to cross open leads—heretofore an insurmountable obstacle in sledging over sea ice.

SEALING THROUGH BREATHING HOLES

There are three main ways of getting seals, depending on the environment in which they are found. In the fall when the open water in which the seal finds himself begins to freeze over he will break the mush ice for breathing purposes, until it gets to be about two or three inches thick, by butting his head against it. After that he keeps the breathing hole open by gnawing. Fortunately for him his teeth, although they are of the carnivorous type, are located somewhat like those of a rodent. As the ice becomes a foot or two feet or even five or six feet thick, the seal's hole assumes a cigar shape, with a breathing opening at the top two or three inches in diameter. Commonly a seal has half a dozen of these breathing openings within an area as large as two or three city blocks. All of them are adequately concealed from man by a snow covering, whether there be two inches of it or two feet; but the odor of seal penetrates the snow above the holes, so that they are readily discoverable to the keen scent of a dog. When a dog team stops to sniff something it is probably a seal hole, for there are few other things on the polar ice that have a smell.

The location of the hole once roughly determined by the dog, the hunter scrapes away the snow until he is so near the water that he begins to see black through the thinning snow. The hole must not be completely uncovered, for then the seal, rising toward it, will notice the increased daylight and go to another hole. When the snow covering has been made thin enough the hunter takes a slender stick or ivory rod, about the size of the knitting needles so frequently seen of late years, and sticks it through the snow into the water of the breathing hole to the depth of two or three inches. When the seal rises to breathe, his nose strikes the ivory rod and pushes it up. As the rod rises the harpoon of the hunter descends; and if it hits the breathing hole it hits the seal, for the seal's nose is in the hole. Once fast to the harpoon the seal is easily held, and with the ice chisel the hunter enlarges the aperture until he can pull the animal out.

If the sea were covered with one continuous expanse of ice this would be the only available method of seal hunting, and it is the only one in the winter time on the land-fast ice between the islands of the Canadian archipelago. On the ocean north of Alaska, however, there is no unbroken expanse of ice, but instead an indefinite number of cakes of ice in continual flux. Under the stress of winds and currents these cakes press against each other, and their edges are crushed up into ridges; but even then the pressure is unequal, so that the ice cakes spin around on their axes, opening triangular and pentagonal holes. If the wind is blowing from the land, the strain on the ice separates it into pieces, and wide lanes of water appear between them. These are the "leads" which so obstruct polar travel and are an unmitigated evil to those who employ the "condensed food system" of exploration. But to us they are in a sense welcome, for in the water of these leads we get most of our food.

Hunting Seals in Open Water

The method of sealing through breathing holes is not difficult but is tedious, for the seal may rise day after day in some other hole than the one you are watching. We much prefer to get them in the open water and nearly always adopt this method. There are seals, generally speaking, everywhere in the Arctic Ocean, but their number differs from place to place and in the same place varies from day to day and season to season. So far as we can judge, the seals that are in open water are continually migrating, although those that find their breathing holes located at a great distance from open water are tied to that vicinity for months or for a whole winter. In the ocean traversed by us ice cakes more than twenty or thirty miles in diameter are exceedingly rare, and open water is seen every day or every other day. At times we travel by crossing from one cake to another, where the corners touch, and perhaps for days at a time are seldom or never out of sight of water. Too much water is a disadvantage from a sealing point of view. The ideal is a long, narrow crack, say twenty to one hundred yards wide, opening through ice of this year's formation. A crack running through old ice is not nearly so likely to be well supplied with seals, for the obvious reason that the old ice contains no breathing holes; but let a crack open through new ice, and the seals that are at breathing holes in the vicinity promptly leave them and swarm to the open water.

We aim to camp near one of these places of open water, and, while the men are building the snow house or pitching the tent, according to the season, and doing the other camp chores, I commonly sit beside the water watching for a seal. They may be as numerous as ducks in a pond, in which case one is shot through the head within a few minutes. If he is within twenty or thirty yards, getting him "ashore" is a simple matter. We carry a retrieving arrangement consisting of a ball of wood about the size of a grapefruit, with recurved hooks on three sides. This knob of wood is attached to a cod line three or four times as long as a cowboy's lariat. The line is held coiled in the left hand while the knob is swung above the head with about a fathom of line, in the manner of the bolas. It can then be thrown two or three times as far as the ordinary lariat. It should be thrown directly over the seal where he is floating horizontally in the water. If shot through the head nine out of ten seals will float, but if shot through the lungs about half of them will sink when the water penetrates the lung cavity. The ball that has been thrown beyond the seal is pulled in hand over hand, and when it is about to slide over his back a slight jerk is given it, one of the hooks catches in the carcass, and the animal is easily pulled to the ice where you are standing. If the seal is too far away to be reached in this manner, we get him by boat. The "boat" is our sled, converted to water use by means of a waterproof canvas tarpaulin spread underneath it and lashed up on the sides.

STALKING SEALS ON THE ICE

Some of our ice journeys have extended well into the summer. At that season the seals are commonly found basking in the sun on top of the ice. If the ice is rough they are easily approached and shot from behind cover, but more commonly they are found on an expanse of level ice where it is impossible to get near enough to shoot them without their seeing the hunter first. They lie on a slippery incline beside their holes or beside a lead of water and if alarmed by anything instantly dive.

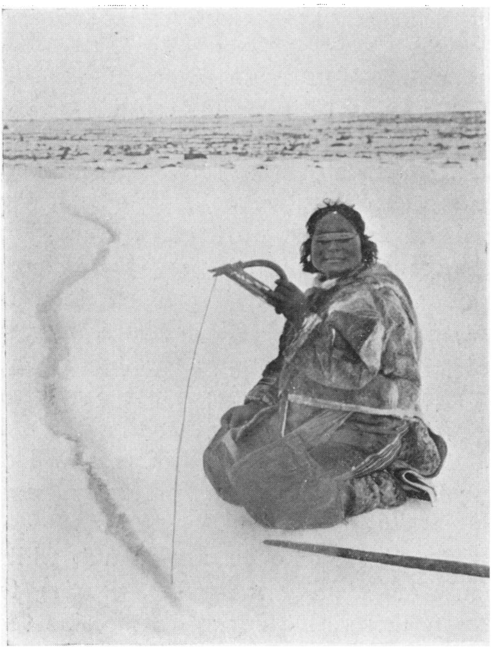


FIG. 8—Eskimo woman fishing through the sea ice. The woman is wearing the native snow goggles, made of a piece of wood with two narrow slits for the eyes, to protect against snow blindness. (See also the man on the right in Figure 1, who has pushed his goggles up above his eyes.)

Under this condition we use another Eskimo method of hunting, the basis of which is not concealment but deception. Since the seal is bound to see you, you must convince him that you are something from which he has nothing to fear. You therefore convince him that you are another seal. This is fortunately easy, because a man lying flat on the ice and seen in a broadside view looks very much like a seal, if he is dressed in dark clothing. To dress in white, so as to conform to the whiteness of the ice, would be a mistake, for the seal's mind is continually centered on his one enemy, the polar bear, so that if he sees anything which is suspicious and white he takes it for a bear and instantly slides into his hole. If, however, he sees something that is suspicious and black, he makes the provisional assumption that it is a seal come out like himself from a hole or a crack to bask in the sun. The eyesight of the northern mammals is not so keen as that of man. The wolf has the best eyes of them all but cannot see you at more than half a mile. The caribou can see you at a little more than a quarter of a mile, and the seal can see you at about three hundred yards. When you get as close as that you must begin to crawl seal-fashion, which is practically snake-fashion. You must not advance head on, for in that position a man does not look particularly like a seal; you must present a broadside view.

Although we spoke of seals as sleeping on top of the ice, the hunter must realize that their sleep is very different from that of ordinary animals. It is continually disturbed by apprehensions of the polar bear. After a doze of half or three-quarters of a minute or possibly a minute and a half, the seal wakes up, lifts his head about twelve or fifteen inches above the ice, and makes a complete survey of the horizon. This takes him eight or ten seconds if he sees nothing suspicious, and he drops asleep for another short nap. During the sleeping periods you advance and during the waking periods you lie motionless. Eventually the seal will see you, at one hundred and fifty to two hundred and fifty yards according to the light.

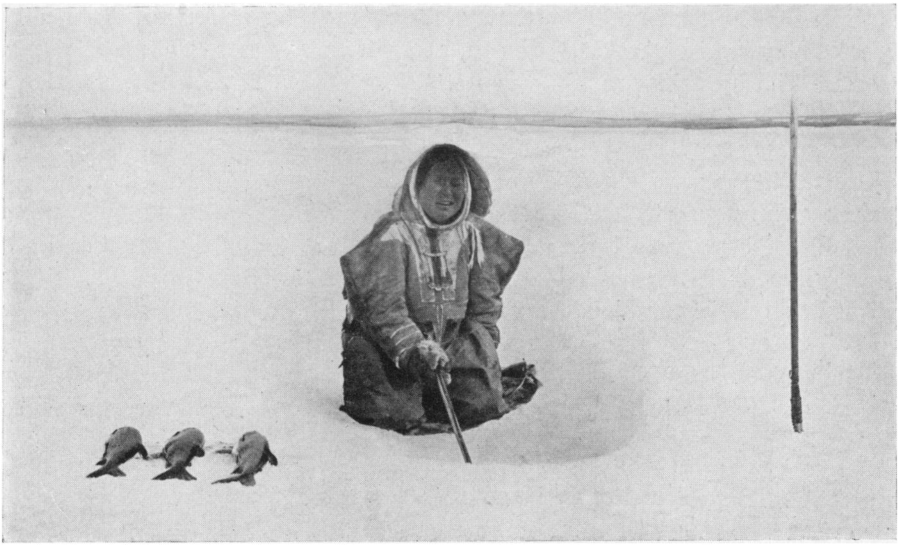


FIG. 9—Eskimo woman fishing through a hole in lake ice.

When he sees you his actions are unmistakable. His body becomes visibly tense, and he raises his head two or three inches higher than before. After one look to make sure that he really does see something suspicious, he moves six inches or a foot or two, so as to be on the very brink of his hole ready for an instant dive. He then watches you intently. If you continue to lie motionless, he becomes suspicious and in a minute and a half or two minutes he will have made up his mind you are not a seal and will dive into the water. When he has been watching you for half a minute or so, it is necessary for you to do something to convince him that you really are a seal. The most elementary thing is to raise your head and go through the motion of looking around for six or eight seconds, and then drop it on the ice again as if you were going to sleep.

When this procedure has been repeated three or four or half a dozen times, at intervals of half or three-quarters of a minute, the seal will be convinced and will resume his naps. After that you advance while he sleeps and lie motionless while he is awake and, whenever he watches you too long, you lift your head and roll around and do other seal-like things.

I have found by trial that my sight is keener than that of a seal by about three to one, and the analytical powers of my mind appear to be keener than his by even a greater ratio. Or perhaps he would prefer to have me say that he is an animal of unshakable convictions. Certainly few men are harder to change from a preconceived belief than is a seal from the once-formed opinion that you are one of his own kind. If merely reasonable care is exercised you can, as an Eskimo can, crawl near enough to seize him by a flipper while you stab him with a knife. Eskimos, however, never do this except as a "stunt" or in the rare case of having lost a harpoon. They commonly harpoon seals at twenty to thirty feet distance, though we shoot them from a distance of fifty to seventy-five yards. Were you to aim for the heart, a killing shot could be secured at a much greater distance; but in the case of a body wound a slight quiver may slide the seal's body down the ice incline into his hole. Even without a quiver the blood may lubricate the ice on which he lies enough to slide him forward into the water by the mere force of gravity. But in the case of a brain shot there is not only no quiver but the blood from the wound flows directly into the water without getting under the seal's body.

THE POLAR BEAR AS A SOURCE OF FOOD

At sea seals give us from seventy-five per cent of our food, as in the waters north of Alaska, to one hundred per cent, as in the area west and north of Prince Patrick Island. When there is another food animal it is the polar bear. In the vicinity of land bears have to be hunted, for there they are afraid of men, dogs, and wolves; but on the ice of the high seas one cannot properly speak of hunting them. They hunt you, or at least they come voluntarily into camp either by following yesterday's sled trail and arriving during the night or by getting the wind of your camp while passing at a distance of anything less than ten miles to leeward, in which case they come up the wind. On land I have seen polar bears pass to leeward of a cache of caribou meat without paying any attention. Undoubtedly they must be able to sniff the odor, but it apparently means nothing to them. It is probable therefore that, as the smell of our camps is completely strange to them, like the smell of venison, they would not trouble to pay us a visit if there were not always about the camp a smell of seal meat, which to the bear is both well known and attractive. It seems a reasonable assumption that bears can easily tell the difference between the smell of a live seal and that of a dead one.

Certainly they act when approaching our camps as if they expected to find a dead seal. They come walking at a steady gait as if not expecting the dead seal to try to elude them, and they come without concealment, for they do not expect a dead animal to be on its guard.

THE ARCTIC FOX AND THE SEA GULL, HIS PARASITES

At sea polar bears are familiar with two animals besides the seal, both of them so elusive that he cannot catch them and never tries, and both so small and timid that he expects no harm from them. These are the white Arctic fox and the sea gull. It is not generally realized that the Arctic fox is almost as much a sea animal as the polar bear. In summer the foxes are on shore living in affluence chiefly on lemmings and birds' eggs. Perhaps ten per cent remain on shore in winter also, picking up a precarious living, but most of them spend the winter at sea. Here they are unable to provide themselves with food, for they are too puny for killing seals and they lack the skill for fishing. They are therefore by necessity parasites on the polar bear. Where you see a bear track you commonly see from one to six fox tracks following. When the bear kills a seal he usually gets an animal weighing a hundred and fifty pounds or more. His idea of a square meal is fifty or sixty pounds of meat and

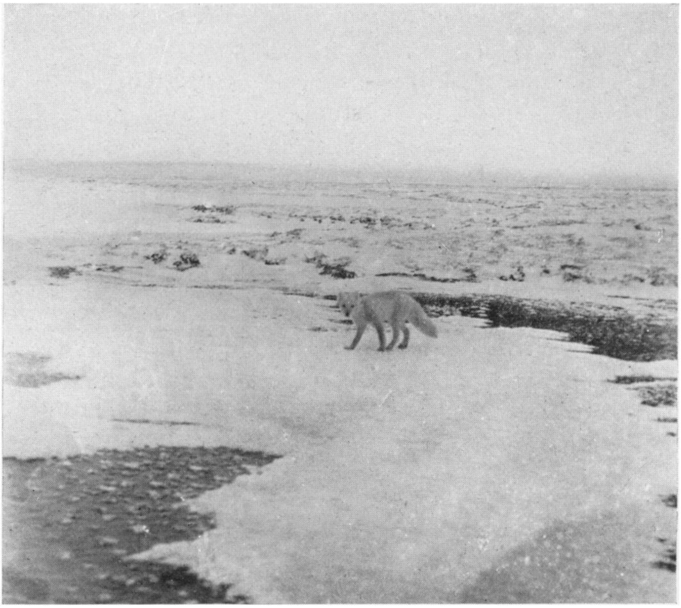


FIG. 10—A white Arctic fox on sea ice. It is not generally realized that the Arctic fox is almost as much a sea animal as the polar bear. Although the foxes are on shore in summer, living on lemmings and birds' eggs, most of them spend the winter at sea, living as parasites on the polar bear, on the remains of seals that he has killed.

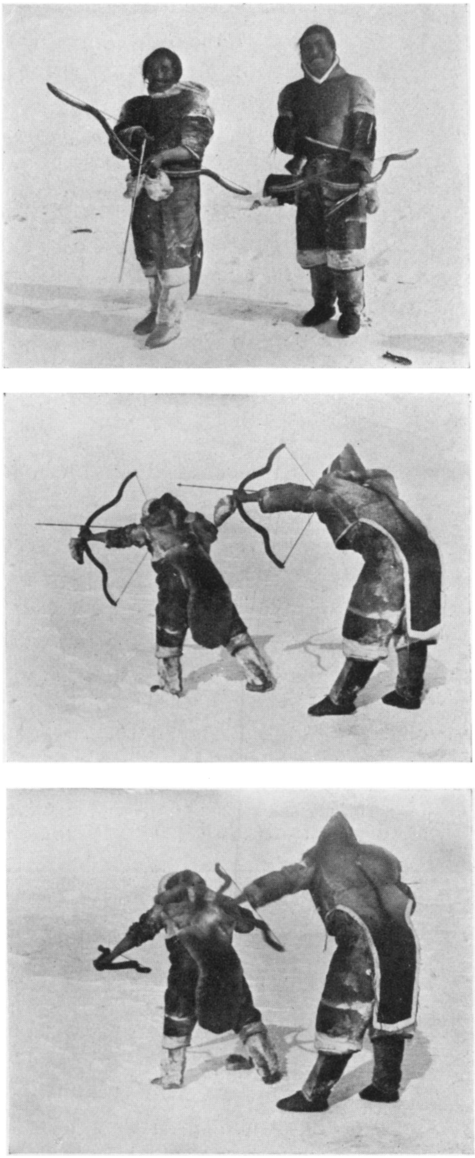
blubber, chiefly blubber; for we find every now and then the bodies of seals with half the blubber eaten, along with the skin that covers that part, and with all the meat still remaining. When the bear has eaten his fill he apparently feels as if he should never care to eat again and walks off leaving the foxes in possession. Should he come back to his kill, the foxes would make room for him readily though perhaps not cheerfully, barking a good deal at a safe distance. In winter there are no sea gulls, but in summer gulls are always hovering about a seal kill, though they flutter away on the approach of a bear.

Because the bear knows no animals at sea except the seals upon which he feeds and the foxes and the gulls which make way for him, he seems to identify any living thing he meets with one or the other of these animals. His identification of a man lying flat on the ice or of a sleeping dog will be with a seal, but if he sees a man standing upright and moving about, or a dog jumping and barking where he is tied, he identifies them with foxes or gulls—noisy but harmless and uninteresting animals.

Visits in Camp from Polar Bears

When a bear approaches camp his tactics depend on what he sees first. If it is a dark dog sleeping he may pay no attention to him at all, mistaking him for the dead seal he expects to find; but if he sees the dog lift his head or otherwise move slightly, he takes him for a live seal and instantly drops flat on the ice and begins to approach with all the art and craft of the seal hunt. If there are ice hummocks about he gets in line with one so as to hide his approach. If the ice is level he slides forward snake-fashion or toboggan-fashion while the dogs are, as he believes, sleeping; but if one of them moves he stops motionless and doesn't stir till everything is quiet again. What he is trying to do is to get within twenty or thirty yards of what he takes to be the sleeping seal. He will then make a dash, slower perhaps than the charge of a lion, but surely not much slower, for the rush of a bear is unbelievably swift for so sluggish-looking an animal. If the bear ever got near enough to begin his dash before the dog saw him, the dog would be killed before he realized that a bear was coming and before the bear realized the dog was not a seal.

We have always been in fear of having a dog killed in this way. To protect them from each other we have to tie them. Hard-worked dogs on small rations have not the spirit for much fighting, but ours are commonly so well fed that they are always spoiling for a fight. One of the six could at any time be crippled if not killed in the minute between the start of a fight and the arrival on the scene of one of us, awakened from a sound sleep by the racket. To protect them from bears we tie them, since we must tie them anyway, to windward of the camp so that a bear coming up the wind will have to pass camp first. We commonly have plenty of meat, and for additional protection we scatter several pieces of frozen meat to leeward of the camp, hoping that the bear will find one and start eating it, making enough noise to waken one of the dogs. By these precautions and through exceptional good fortune it has happened with us that a man or a dog has always seen an approaching bear before he made his final dash.



Figs. 11-13—Eskimo bowmen of Coronation Gulf; three views to illustrate the use of the bow. The bows are made each of three pieces of wood and have the three-curve Tatar shape. Their extreme range is 100 yards; effective range, 75 yards. The arrows have heads of stone or beaten native copper.

The moment a dog sees a bear he starts barking, and in a second every other dog is barking. At that moment the bear loses all interest. He apparently thinks that after all they are not seals but foxes. As he still smells the seal meat he reverts to his former opinion that there is awaiting him a seal carcass around which a number of foxes have gathered, and he gets up and resumes his quiet walk into camp, glancing now and then with little interest and no hostility at either a dog or a man that he sees moving about. It is the nature of the beast to glance over his shoulder from side to side as he walks and to expose alternately one side or the other to anyone who is in the direct line of his advance. The approach of a bear to camp is with us a commonplace and causes no excitement. A second man may stand by in case of misadventure while the first waits with rifle ready till one side or the other of the bear is exposed, and then a bullet near the heart ends the story.

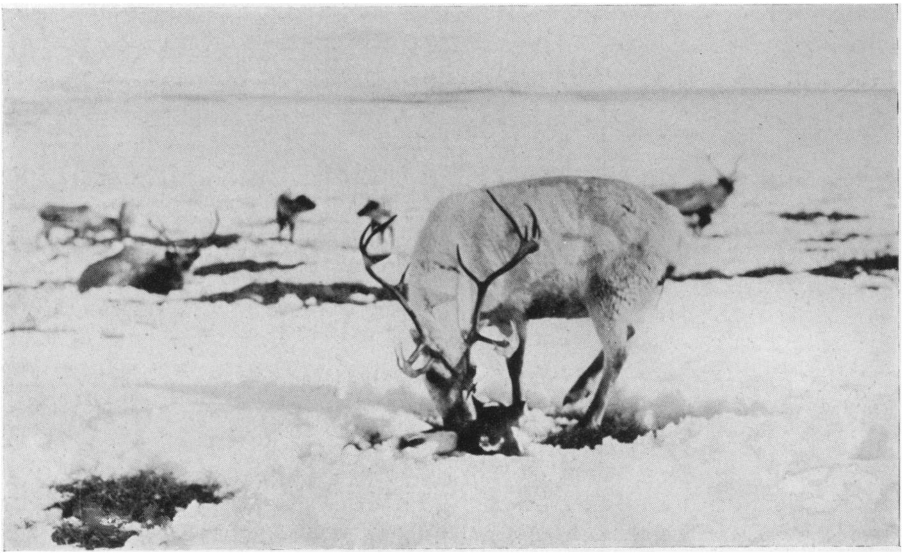


FIG. 14—Caribou feeding on the lichen under the snow cover of the tundra. (See also the views of migrating caribou, in the *Geogr. Rev.*, Vol. 2, 1916, pp. 58-59.)

ECONOMIC USE OF AMMUNITION

Safety as well as success in exploratory parties such as ours depend so largely on rifles that we naturally use those we think are the best. Our 6.5 millimeter rifle is said to have a muzzle velocity of 3,160 feet per second, and, though the cartridges are so light that there are more than thirty to the pound, we have found this so efficient a weapon that if more than one bullet is needed to kill the largest North American animal it is not the fault of the rifle but of the man that holds it. By careful shooting and by never shooting anything smaller than a wolf we have been able to average 125 pounds of meat, live weight, for each cartridge.

This means that we get over two tons of food for a pound of ammunition, which is another way of saying that, from the point of view of transportation, ammunition is several thousand times as economical as pemmican or any other form of condensed food.

Practicability of Living Off the Country

There may be areas of the polar sea where no food animals are found; but this seems to me unlikely, for the same arguments were advanced against the foodlessness of the areas we have explored as are still available for the foodlessness of those as yet unvisited. It is at any rate certain that if there are any foodless sections of the Arctic Ocean they are foodless not because of their latitude but because of the immobility of the ice and the consequent inability of seals to find breathing spaces.

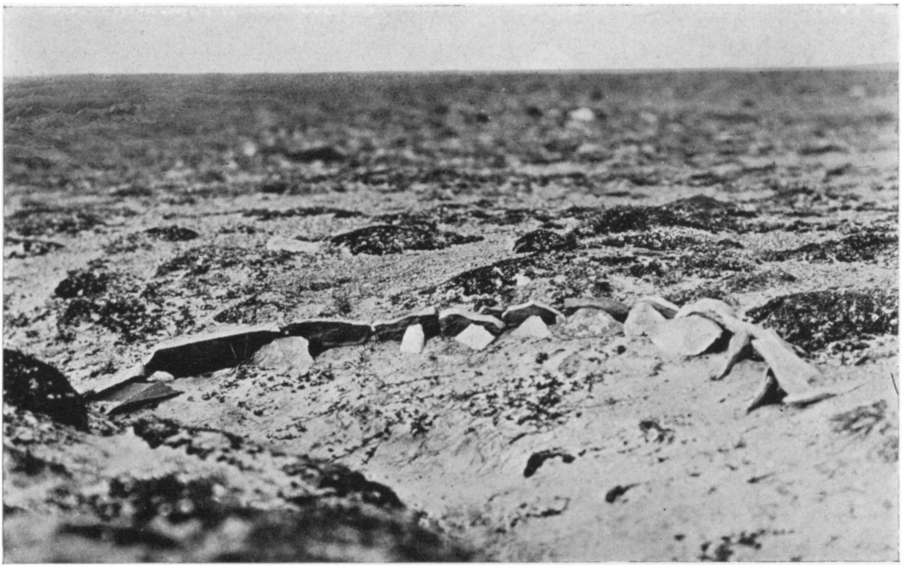


Fig. 15—An Eskimo "blind" to hide behind when shooting caribou.

By the system of "living off the country" an exploratory journey of several years can be made, with the one modification that it is necessary to stop somewhere and accumulate during the daylight of autumn enough food and fuel to last through the darkness of winter. We are sure that this can be done at sea, and no one who has accompanied me on any of our sea trips doubts that wintering on the moving ice would be safe so far as food is concerned. At least there would be no trouble about putting up enough meat and blubber in the summer; the only element of danger would be that should the ice cake upon which the food is stored happen to break up during the winter, some of the food might be lost by spilling into the water. This would be a real danger, but it could be guarded against in a measure by not trusting all the eggs to one basket, but making caches of food and fuel in perhaps half a dozen places through an area the size of a city block.

That one can safely live through the winter on an uninhabited island we demonstrated in 1916-1917. In the spring and summer of 1916, while three of us were making an exploratory journey of eight months' duration, a party of fourteen, consisting of three Eskimo families and some white men under command of Storker Storkersen, were hunting in Melville Island. They dried for sledge provisions for the coming spring the meat of thirty seals and over ninety musk oxen and secured enough skins for the women to make into clothing for winter use, and tallow and blubber enough for fuel. It happened that they found several good coal mines, and, as we had some galvanized iron cans which could be converted into stoves, we burned coal in large houses made of musk-ox skin, while otherwise we should have burned seal oil in smaller snow houses lined with skins.

Caribou Hunting

The hunting of caribou is simpler than that of seals. They are not hard to find, for with our good binoculars we can see them at distances of five to ten miles; they are not hard to hit, for they are bigger than seals and our rifles have a trajectory practically flat up to three hundred yards; it can hardly be supposed we lack skill in hunting after having lived by our rifles in the Arctic the larger part of ten years. I have accordingly long since ceased considering that (where game is scarce) there is any appreciable chance of failure in getting whatever caribou may be in a given section, or at least seventy-five per cent of them. It may take five or more hours to approach within sure shooting distance of a band after you first get within half a mile of them, but unless they are frightened through some accident, such as a sudden change of wind or the appearance of a wolf that stampedes them, the hunter should secure the entire band and commonly enough does so if the number is not over ten and occasionally even when there are over twenty.

Musk Oxen

With musk oxen one can scarcely speak of hunting methods at all. If you have a dog with you and set him on the herd, they will stand in a defensive circle while you kill the entire band. If you are alone, there is no trouble in approaching near enough to kill several from behind cover. Two or three men together can run up to a herd which will stand on the defensive against them just as it would against dogs, provided only the men run at top speed and take their positions around them at a distance of five or ten yards. We had two hunting camps in Melville Island. At the southern one this method was never used, but at the northern one the men discovered it late in the hunting season and used it in killing three or four of the last bands. The method of using dogs is an ancient one known both to the Eskimos and the Indians.